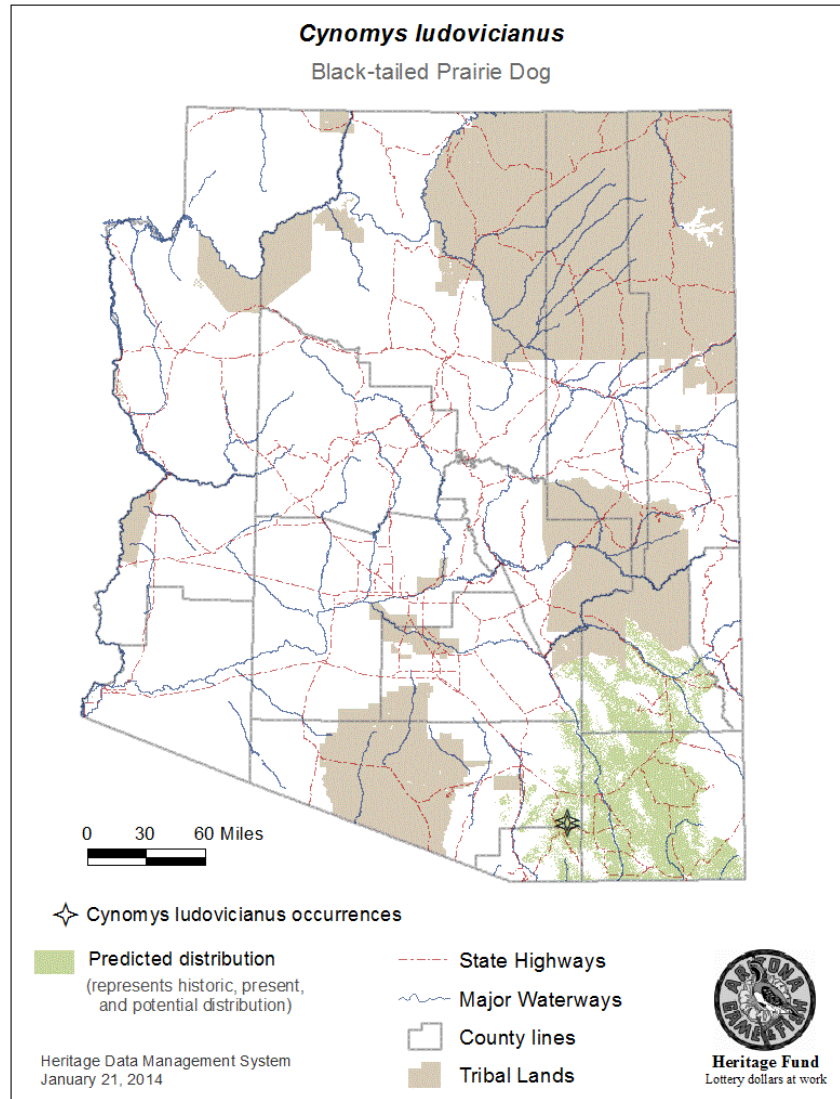


BLACK-TAILED PRAIRIE DOG HABITAT MANAGEMENT GUIDELINES

INTRODUCTION

Black-tailed prairie dogs (BTPD, *Cynomys ludovicianus*) occur only as reintroduced populations in Arizona within the grasslands of Las Cienegas National Conservation Area southeast of Tucson (Fig 1). They were reintroduced in Arizona in 2008 after being extirpated from the state nearly 50 years prior (AGFD 2005, Hicks 2012a). Prior to extirpation, BTPD occurred in plains and desert grasslands at elevations from 4136 to 5200 ft in southeastern Arizona. The historical dominant vegetative associations were blue grama (*Bouteloua gracilis*) mixed with threeawns (*Aristida* species; AES 2010). The current reintroduced population is on lands administered by the Safford Field Office of the Bureau of Land Management (BLM) (Blasch 2004).

Figure 1. Distribution of Black-tailed Prairie Dogs in Arizona.



The black-tailed prairie dog was extirpated from Arizona in 1960, due in part to the conversion of its habitat for agriculture, urbanization, resource extraction, and livestock grazing. However, the primary reason was the poisoning efforts in the early 1900s aimed at ridding the lands of prairie dogs, which were considered pests that competed for forage with livestock. It was also believed that their short-clipping behavior degraded grassland productivity. Of the 11 states where the black-tailed prairie dog historically occurred, Arizona was the only state completely successful at exterminating the species from within its borders (AGFD 2013, Hicks 2012b).

A petition to list the species as threatened under the Endangered Species Act was filed in 1990 and again in 2007. However, in 2009, the U.S. Fish and Wildlife Service (FWS) determined that listing the species was not warranted. The Arizona Game and Fish Department (AGFD) began reintroducing the black-tailed prairie dog to the state in 2008 with the goal of re-establishing the species to its historic range while improving grassland health and animal diversity. During re-establishment, hunting of the species in Arizona is prohibited (AGFD 2013).

Current threats to the species throughout its range include continued habitat loss and fragmentation through conversion of grassland to cropland and urbanization, change in vegetation communities, large-scale poisoning, recreational shooting, and sylvatic plague (AES 2010). Many other wildlife species thrive on the presence of prairie dog towns, thus these threats not only cause a decline in prairie dogs, but also cause a decline in the populations of the species that prey upon them or rely on their living quarters for shelter. One such species is the critically endangered black-footed ferret (*Mustela nigripes*) which faced extinction due to extermination efforts against prairie dogs. Other species that are also negatively impacted by the decline of prairie dogs include the badger, coyote, eagle, and burrowing owl (AGFD 2013, NPWRC 2013). According to VanPelt (2000), there are more than 170 vertebrate species associated with or obligate to prairie dogs and prairie dog towns. There are a greater density and diversity of avian species and almost six times the number of terrestrial predators in or near prairie dog towns when compared to areas without prairie dogs (VanPelt 2000).

GENERAL BIOLOGY

The black-tailed prairie dog is a small burrowing rodent and a member of the squirrel family. They are brown or yellowish-tan on the back, lighter cream-colored on the belly, and have a black tip at the end of the tail, which, along with the slightly longer tail, sets them apart from the other four North American species. They range in length from 14-17 inches with a 2-3 inch long tail, weigh from 1-3 pounds, have very small ears and paws, and very long claws. The life span is longer for females who may reach approximately eight years while males may only live approximately five years (Hicks 2012b, AGFD 2013, NPWRC 2013).

The black-tailed prairie dog is a diurnal and highly social colony-dweller. They are only active during the day, spending most of their time feeding and socializing (NPWRC

2013), and burrow underground at night. Visual and vocal communication is important, and prairie dogs will utilize a variety of unique calls for different predators or situations. The well-organized colonies (dog towns) are made up of smaller family groups called coteries, which typically consist of a single breeding male, one to four breeding females, and their offspring (Hoffmeister 1986, Hicks 2012b). Besides the longer black-tipped tail, they are also unique from other prairie dogs in that they do not truly hibernate (AGFD 2013, Hicks 2012b), although they do spend more time underground during adverse weather and the colder winter months (Hoffmeister 1986). Prairie dogs acquire all the water they need from the foods they consume and therefore do not need to live near a water source (AGFD 2013).

Reproduction

Black-tailed prairie dogs reach breeding age at around two years. They mate once a year during the spring, which occurs in late February in Arizona. Gestation lasts approximately 5-6 weeks and one to eight young will be born in late March or early April, although on average, only three will survive. The pups will remain in the burrow for up to six weeks, appearing above ground in early to mid-May (Hoffmeister 1986, Hicks 2012ab, AGFD 2013).

Movement

Colony sizes for the black-tailed prairie dog range from 49.4 to 148.2 acres (20 to 60), although colonies of less than 24.7 acres (10 ha) to complexes up to several hundred hectares have been observed (Blasch 2004). Both males and females are territorial. Females remain within their coterie for life, while males disperse once they reach breeding age. Dispersal of males is generally limited to 3 miles (5 km) or less, however the presence of roads and livestock trails may facilitate further dispersal up to 6 miles (10 km; Blasch 2004).

HABITAT REQUIREMENTS

Black-tailed prairie dogs inhabit flat, dry, open plains grasslands and the upper limits of desert grasslands at elevations ranging from 4,136 to 5,200 ft (1260 to 1574 m; Blasch 2004, AES 2010). Historically, the dominant grasses in these biotic communities included blue grama (*Bouteloua gracilis*) mixed with threeawns (*Aristida* species; AES 2010).

A prairie dog colony or town may cover from one to several thousand acres of grassland habitat. They are rich in biotic diversity and contribute to the entire ecosystem in which they occur (Van Pelt 2000). Prairie dogs are considered a keystone species in grasslands. They have both a unique and large overall effect on the ecosystem structure and function which cannot be provided by any other species (AGFD 2013). Their digging and grass-clipping activities facilitate the mixing of soil and organic matter, which fertilizes and aerates the soil and allows water to penetrate deeper into the ground. This increases the nutritional content of the forage and also facilitates the infiltration of water into the deeper root zones and aquifers rather than allowing it to evaporate or erode away the surface (NMDGF 2008, Hicks 2012ab, AGFD 2013).

Topography/Groundcover Component

Prairie dogs prefer to live in open areas sparsely populated by short grasses with gentle slopes. They will avoid areas with tall and/or thick vegetation and areas with slopes steeper than 10%, however, they will sometimes use areas with slopes up to 20%. Vegetation within a colony is usually less than 1 ft (30.5 cm) in height and is composed primarily of grasses and forbs. Often, prairie dogs will choose to locate their towns in areas that have been heavily grazed by cattle (NPWRC 2013). Range condition and composition of plant species influences the distribution and expansion of prairie dogs. Areas where warm season grasses dominate and grazing by cattle is intense, black-tailed prairie dogs may expand due to short grass cover. Uresk (1993) suggests resting pastures and managing for cool season grasses if reduction in expansion is desired.

Low vegetation and level topography allow prairie dogs to have a clear view of their surroundings so they can detect predators from a distance. Prairie dogs will actively clip grasses around burrow entrances. Grass-clipping increases the organic matter content available for decomposition which, along with digging, helps to cycle nutrients. This promotes the growth of certain types of plants and increases the nitrogen concentration and nutritional value of the new vegetation. Ungulates such as pronghorn, cattle, and bison often prefer to forage within prairie dog colonies to take advantage of this valuable nutritional content (Hicks 2012a, AGFD 2013). Because they prefer low vegetation, prairie dogs will also chew taller shrubs and trees such as mesquite, which have been encroaching on Arizona's southern grasslands (Hicks 2012a). This encroachment has been attributed to the absence of prairie dogs that would otherwise prevent these trees from growing in an area where they need to have a clear view (AGFD 2013).

Optimal habitat includes short and mid-height grassland at elevations <8000 ft (2438 m) with vegetation composed primarily of grasses <11.8 in (<30 cm), and level slope <20% (< 10% preferred). The ground should be <40% bare and vegetation should be >25% total productive herbaceous cover relative to the total canopy cover (productive and non-productive) (Roe and Roe 2003, Blasch et al 2004).

Soil/Burrow Component

Prairie dog colonies consist of a complex system of extensive, deep, and permanent tunnels and burrows that provide protection from weather and predators, resting quarters, and nesting places for young (Hicks 2012ab). Burrow entrances are often quite visible with large dome-shaped mounds that can be up to three feet high and seven or eight feet across (Hoffmeister 1986). The mounds are formed from the soil brought up from the burrow and tunnel systems and they may provide both a vantage point and protection from flooding (NPWRC 2013). Tunnels may plunge straight down 3 to 10 feet then horizontally leveling out with several tunnels excavated off the main tunnel leading to nests. Tunnels are strategically arranged so as to allow wind to blow through and provide ventilation (NPWRC 2013). Along with providing personal shelter, enhancing soil composition, and increasing water infiltration into aquifers, prairie dog tunnels and burrows also provide shelter for many other species including endangered black-footed

ferrets, burrowing owls, foxes, rabbits, ground squirrels, snakes, lizards, and insects (Hicks 2012a,b).

Soil type is extremely important thus prairie dogs only occur in areas that have soil conducive to developing burrow systems. Substrate size and soil texture will influence both the establishment and expansion of colonies. Burrows built in sand and rocky or gravelly soils are prone to collapse and those built in soils high in silt and clay may become highly saturated and collapse when wet. Burrows will retain their shape and strength well in loamy soils with little to no gravel. Black-tailed prairie dogs generally avoid areas with poorly drained soils, and sand and rocky or gravelly soils (particles ≤ 8 cm in diameter). Optimal soil conditions are well-drained, at least 6.6 ft (2 m) deep, fine sandy loams consisting of little to no gravel, low in clay ($<30\%$), medium in sand ($\sim 50\%$), and medium to high in silt ($>70\%$) (Blasch 2004, Roe and Roe 2003).

Food Component

Black-tailed prairie dogs are herbivores and eat a wide variety of grasses, weeds, and shrubs. They will feed on stems and leaves primarily, resorting to eating seeds and roots as it becomes necessary, and will also consume insects. In Arizona, they prefer grasses over forbs and their main food source consists of buffalograss (*Buchloe dactyloides*) and blue grama (*Bouteloua gracilis*) as well as several forb species (USFWS 2009). It is documented that in some instances they prefer grasses over forbs but forbs over grasses in other cases; therefore, it should be noted that depending on the plant variation and location of the colony, black-tailed prairie dogs may show different food preferences (BCPOS 2012, NPWRC 2013).

The existence of livestock grazing and prairie dogs are not mutually exclusive. Although prairie dogs may forage the same species as livestock and overgrazing may negatively impact prairie dogs, properly managed grazing within prairie dog colonies can potentially benefit both prairie dogs and cattle. For instance, prairie dogs decrease cattle forage by clipping grasses they do not consume in order to increase visibility; at the same time, this clipping activity benefits the cattle by increasing the nutrient content of the remaining forage. Similarly, while cattle grazing may decrease forage availability, it also increases visibility for prairie dogs by reducing the height of the surrounding cover (NPWRC, USFWS 2013). Research has revealed that despite less biomass on prairie dog colonies, forage quality, digestibility, and productivity actually increases from activities of prairie dogs as they facilitate greater species diversity as well as delay phenological development of vegetation (Uresk 1993).

MONITORING

Habitat

Roe and Roe (2003) describe that soil, vegetation, slope, elevation, previous use of site by prairie dogs, proximity of the site to existing prairie dogs, proximity of the site to neighboring properties, and natural dispersal barriers are factors to be considered when evaluating prairie dog habitat. Methods for habitat sampling include taking plot samples

to describe vegetation, elevation, slope and soil in the study area. Randomly distributed, circular plots with ocular estimation are recommended. Data collected and documented for each plot should include:

1. Percentage of basal cover (i.e. the area of all the viable plants in the circle at or near the ground surface) relative to the entire circular plot
2. Percentage of each type of vegetation (grass vs. forb vs. shrub) relative to the percentage of basal cover
3. Percentage of each type of suitable vegetation relative to the percentage of basal cover including cool-season grasses, warm-season grasses, and forbs.
4. Slope, aspect and elevation
5. Soil samples to analyze soil texture

Populations

Methods for estimating prairie dog population density include counts of plugged and reopened burrows, counts of total number of burrows, mark-recapture, and visual counts (Menkens and Anderson 1993). Biggens et al. (1993) state that visual counts and mark-recapture methods under-estimate actual densities and are costly and time consuming, thus they recommend counting burrows. However, Biggens et al. indicate that only active burrows rather than total burrows should be counted as this method leads to stronger correlated results.

KEY THREATS

- Habitat loss and fragmentation
- Change in vegetation communities
- Recreational shooting
- Sylvatic plague

HABITAT GUIDELINES

- Slope < 20%, <10% preferred
- Elevation <8000 ft (2438 m)
- Soils
 - Loamy (fine to medium) texture
 - Little or no gravel
 - <30% clay
 - ~50% sand
 - >70% silt
- Vegetation composed primarily of grasses (<10% shrubs)
- Ground cover
 - <40% bare soil
 - $\geq 25\%$ Total vegetative canopy
 - $\geq 25\%$ productive suitable vegetative cover relative to total basal cover
- Vegetation height <11.8 in (30 cm)
- Colony area² ≥ 10 acres
- If BTPD population was extirpated by plague, relocation to area must be > 1 year from date of outbreak

LITERATURE CITED

- Arizona Ecological Services Field Office (AES). 2010. Black-tailed Prairie Dog (*Cynomys ludovicianus*). General Species Information. Arizona Ecological Services Field Offices, Southwest Region, U.S. Fish and Wildlife Service.
- Arizona Game and Fish Department. 2005. *Mustela nigripes*. Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. 6 pp.
- Arizona Game and Fish Department. 2013. Black-tailed Prairie Dog Reintroduction. Web Abstract. Accessed 08-20-2014 at: http://www.azgfd.gov/w_c/nongameandendangeredwildlifeprogram/Black-tailedPrairieDog.shtml
- Biggins, D. E, B. J. Miller, L. R. Hanebury, B. Oakleaf, A. H. Farmer, R. Crete, and A. Dood. 1993. A Technique For Evaluating Black-Footed Ferret Habitat. Pages 73–88 in J. L. Oldenmeyer, D. E. Biggins, and B. J. Miller, editors. Proceedings of the Symposium on the Management of Prairie Dog Complexes for the Reintroduction of the Black-Footed Ferret. U.S. Fish and Wildlife Service Biological Report 13.
- Blasch, C. L., D. M. O'Neill, and W. E. Van Pelt. 2004. Black-tailed Prairie Dog: Assessment of Potential Habitat on Lands Administered by the Bureau of Land Management. Nongame and Endangered Wildlife Program Technical Report 245. Arizona Game and Fish Department, Phoenix, Arizona.
- Boulder County Parks and Open Space (BCPOS). 2012. Prairie Dog Habitat Element of the Grassland and Shrubland Management Policy. Parks and Open Space Department. Boulder County. 86 pp.
- Hicks, H. 2012a. Welcome Back Black-tailed Prairie Dogs. Arizona Wildlife Views. 57(4): 18-21.
- Hicks, H. 2012b. Black-tailed Prairie Dog. Arizona Wildlife Views. July-August 2012: 36.
- Hoffmeister, D.F. 1986. Mammals of Arizona. Arizona Game and Fish Department and University of Arizona Press, Tucson. 276 pp.
- Koprowski, J.L. and C.A. Coates. 2004. Analysis of the suitability of potential habitat for the extirpated Arizona black-tailed prairie dog. Final Report for Arizona Game and Fish Department Heritage Grant I03007.

- May, H.L., Wildlife Habitat Council. 2004. Black-tailed Prairie Dog (*Cynomys ludovicianus*). Fish and Wildlife Habitat Management Leaflet. Wildlife Habitat Management Institute, National Resource Conservation Service, U.S. Department of Agriculture, Madison, Mississippi. 12 pp.
- Menkens, G.E., and S.H. Anderson. 1993. Mark-Recapture and Visual Counts for Estimating Population Size of White-tailed Prairie Dogs. Pages 67-72 in J. L. Oldenmeyer, D. E. Biggins, and B. J. Miller, editors. Proceedings of the Symposium on the Management of Prairie Dog Complexes for the Reintroduction of the Black-Footed Ferret. U.S. Fish and Wildlife Service Biological Report 13.
- Miller, B., D.E. Biggins, and R. Crete. 1993. Workshop Summary. Pages 89-92 in J. L. Oldenmeyer, D. E. Biggins, and B. J. Miller, editors. Proceedings of the Symposium on the Management of Prairie Dog Complexes for the Reintroduction of the Black-Footed Ferret. U.S. Fish and Wildlife Service Biological Report 13.
- New Mexico Department of Game and Fish. 2008. Draft Conservation Plan for Gunnison's Prairie Dog (*Cynomys gunnisoni*) in New Mexico. New Mexico Department of Game and Fish, Conservation Services, Division, Santa Fe, New Mexico.
- Northern Prairie Wildlife Research Center (NPWRC). 2013. Small Mammals of North Dakota: Black-tailed Prairie Dog (*Cynomys ludovicianus*). Northern Prairie Wildlife Research Center, U.S. Geological Survey.
- Roe, K.A. and C.M. Roe. 2003. Habitat selection guidelines for black-tailed prairie dog relocations. Wildlife Society Bulletin. 31(4):1246-1253.
- Uresk, D. 1993. Relation of Black-tailed Prairie Dogs and Control Programs to Vegetation, Livestock, and Wildlife. Page 8 Synopsis in J. L. Oldenmeyer, D. E. Biggins, and B. J. Miller, editors. Proceedings of the Symposium on the Management of Prairie Dog Complexes for the Reintroduction of the Black-Footed Ferret. U.S. Fish and Wildlife Service Biological Report 13.
- U.S. Fish and Wildlife Service. 2009. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition to List the Black-tailed Prairie Dog as Threatened or Endangered. Federal Register 74(231): 63343-63366.
- U.S. Fish and Wildlife Service. 2013. Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To List the Gunnison's Prairie Dog as an Endangered or Threatened Species. Federal Register 78(220): 68660-68685.
- Van Pelt, W. E. 1999. The Black-tailed Prairie Dog Conservation Assessment and Strategy. Nongame and Endangered Wildlife Program Technical Report 159. Arizona Game and Fish Department, Phoenix, Arizona.

Van Pelt, W.E. 2000. A Tale of Two Dogs. Arizona Wildlife Views. November-December 2000: 11-15.

Boulder County Parks and Open Space (BCPOS). 2012. Prairie Dog Habitat Element of the Grassland and Shrubland Management Policy. Parks and Open Space Department. Boulder County. 86 pp.